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Prior research indicates that children's social relationships are important predictors of later school success. However, research has failed to address how different school relationships, such as those with teachers and peers, work together to predict later academic achievement. Thus, the goal of the current study was to investigate the role of student-teacher relationships and presence of a mutual friend in kindergarten on second grade academic achievement via teacher-reported and standardized assessments. Moreover, we explored children's perceived competence as the mediational process through which kindergarten school relationships impact second grade academic achievement. Participants included 163 children from the RIGHT Track project who participated in kindergarten and second grade assessments and had complete data at both time points. At 5 years of age (kindergarten), classroom sociometric interviews and the Student-Teacher Relationship scale were completed. At 7.5 years (2<sup>nd</sup> Grade), assessments of academic achievement and perceived competence were gathered. Results yielded a significant interaction between kindergarten student-teacher relationships and mutual friend presence in predicting 2<sup>nd</sup> grade teacher-reported academic achievement; perceived competence did not mediate this association. This study identified the role of multiple, salient school relationships in predicting academic achievement and indicates the importance of fostering social development in various arenas within the school context.

THE INTERACTION OF STUDENT-TEACHER RELATIONSHIPS AND  
MUTUAL FRIENDS ON ACADEMIC ACHIEVEMENT:  
THE ROLE OF PERCEIVED COMPETENCE

by

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## CHAPTER I

### INTRODUCTION

Children are involved in many important and influential social relationships within the school context including relationships with teachers and peers. These relationships impact performance within several school domains including behavioral, social, and academic arenas. One salient indicator of a child's success in school is their ability to learn and retain information taught within the classroom, known as academic success. We know that early contributors to academic outcomes are important because early academic achievement has implications for later development (e.g., Berndt, Hawkins, & Jiao, 1999; Graziano, Reavis, Keane, & Calkins 2007; Hamre & Pianta, 2001; Pianta & Stuhlman, 2004) including later academic achievement and success and potential career opportunities. Further, academic achievement is relatively stable after first grade (Entwisle & Hayduck, 1988). We also know that early academic achievement is related to subsequent academic performance in elementary and middle school (e.g., Berndt et al., 1999; Entwisle & Hayduck, 1988; Graziano et al., 2007; Hamre & Pianta, 2001; Pianta & Stuhlman, 2004), and that a child's early performance in academics is related to later graduation rates, (e.g., Cairns & Cairns, 1994; Garnier, Stein, & Jacobs, 1997) being accepted to a four-year institution, (Arbona, 2000) and ultimately the number of potential career opportunities. Given the importance of academic achievement, we

need to identify early social relationships that can put children on a positive trajectory for long-term success.

### **Student-Teacher Relationships**

Research examining predictors of academic success has highlighted the importance of the student-teacher relationship (e.g., Pianta & Stuhlman, 2004). A review of factors associated with positive youth outcomes found that an adaptive relationship with an adult in a non-caretaking role (e.g., teacher) is the most commonly associated school factor related to positive outcomes in school, including academic achievement (Downer, Driscoll, & Pianta 2008). In addition, the influence of early student-teacher relationships is evidenced through eighth grade (Hamre & Pianta, 2001). Children who have a positive student-teacher relationship in kindergarten, characterized by high degrees of closeness and low levels of conflict and dependency, are more likely to display higher levels of academic achievement (Pianta & Stuhlman, 2004). Conversely, children who have a negative student-teacher relationship typically have more conflict, are more dependent on, and are less close with their teachers (Pianta & Stuhlman, 2004). This conflict may result in more frequent distractions from academic materials in school and ultimately lower levels of academic achievement (Pianta & Stuhlman, 2004).

The early student-teacher relationship is of particular importance. We know that teachers are an important figure in a child's life and teachers can provide support for children as they move from a home to school environment (Pianta & Stuhlman, 2004). However, as children progress through school and become more ingrained within their peer network, the influence of the student-teacher relationship diminishes (Feldlaufer,



Midgley, & Eccles, 1988). Nonetheless, the kindergarten student-teacher relationship is influential of academic outcomes in early elementary school through eighth grade (Hamre & Pianta, 2001). The importance of early student-teacher relationships may be related to how children perceive student-teacher relationships across time. Some research suggests that students with very close relationships with teachers in later grades may experience social stigma, (e.g., teacher's pet) as compared with those with positive relationships in early school years (Hamre & Pianta, 2001). Thus, to best examine the potential protective effects of the student-teacher relationship on later elementary academic achievement, it is important to examine this relationship beginning in early elementary school (Birch & Ladd, 1997; Perry, Donohue, & Weinstein, 2007).

Kindergarten teachers are intimately involved in a child's school day and thus represent an important dimension in determining children's school success (e.g., Graziano et al., 2007; Hamre & Pianta, 2001; Jerome, Hamre, & Pianta, 2009). By having a positive relationship with the teacher, the child is likely to have more frequent and more meaningful interactions with his/her teacher (e.g., Pianta & Stuhlman, 2004). These more frequent and meaningful student-teacher interactions will facilitate more student motivation to learn and gain praise from their teacher (e.g., Hamre & Pianta, 2001; Urdan & Maehr, 1995). Conversely, having a negative student-teacher relationship in kindergarten may decrease the frequency of meaningful interactions with teachers. This in turn decreases the desire of the child to perform academically which then may decrease academic performance (e.g., Hamre & Pianta, 2001; Urdan & Maehr, 1995). Children who have a negative student-teacher relationship participate less often in class

and report liking school less compared to children with a positive student-teacher relationship (Ladd & Burgess, 2001). Therefore, kindergarten student-teacher relationships impact a child's classroom engagement as well as desire for learning which in turn impact children's levels of academic achievement.

Although the student-teacher relationship is related to class participation and a desire to learn, these associations may differ based on a child's gender. Specifically, girls tend to have more positive relationships with their teachers often resulting in higher levels of academic achievement (Ladd, Birch, & Buhs, 1999; Murray & Murray, 2004). Boys, on the other hand, typically have more conflict with their teachers often resulting in lower levels of academic achievement (Ladd et al., 1999; Murray & Murray, 2004). One explanation for this gender difference in student-teacher relationships is that girls are more likely than boys to look to others for support (Crosnoe, Johnson, & Elder, 2004). Thus, when girls are struggling with academic materials, they may be more inclined to seek out their teachers for support. Another explanation is that in kindergarten, boys tend to demonstrate more externalizing behaviors than girls (Morgan, Farkas, & Wu, 2009). This may result in the higher levels of conflict between boys and teachers whereas girls, who demonstrate less externalizing behaviors in kindergarten, develop closer student-teacher relationships.

In summary, positive student-teacher relationships are characterized by more closeness whereas negative student-teacher relationships are characterized by more dependence and conflict (e.g., Ladd et al., 1999; Murray & Murray, 2004; Pianta & Stuhlman, 2004). Children who have a more positive student-teacher relationship are

likely to demonstrate higher levels of academic achievement compared to children with a more negative student-teacher relationship (e.g., Downer et al., 2008; Jerome et al., 2009; Pianta & Stuhlman, 2004). This is likely due to the more frequent interactions between students and teachers when the student-teacher relationship is more positive (Pianta & Stuhlman, 2004). Thus, positive student-teacher relationships may act as a protective factor for academic achievement even in the face of IQ (Graziano et al., 2007). However, other school relationships may similarly impact children's later academic achievement.

### **Mutual Friends**

In addition to student-teacher relationships, research has demonstrated that peers and friends are also predictors of academic achievement (e.g., Hoza, Molina, & Bukowski, 1995; Wentzel, 1991). Prior research defines friendships as special, close dyadic relationships (Bukowski & Hoza, 1989) which are voluntary and based on reciprocity (Rubin, Bukowski, & Parker, 1998). The term mutual friend has been used to convey the reciprocity that is necessary between members of the friendship.

Similar to teachers, mutual friends provide a context for children to expand their knowledge which ultimately may increase their later academic achievement. Children who possess mutual friends in kindergarten receive influence, information, and social support from their mutual friends throughout elementary school (Snyder et al., 2005). In addition, engaging with mutual friends promotes perspective-taking, problem-solving, language skills, and scientific and logical reasoning (Parker et al., 2006). The benefits of these skills are greatest when the child is interacting with a mutual friend (Parker et al., 2006). This suggests that mutual friends, more so than peers, facilitate the development

of the skills necessary to succeed in academics over time. Moreover, this indicates that children who do not possess a mutual friend are at a disadvantage as they possess fewer resources to develop the skills that contribute to successful academic achievement.

A review of the literature did not yield any studies that examined a gender-by-mutual friend effect on academic achievement. However, gender differences do exist with regard to a child's peer network. Beginning as early as age three, children tend to interact with same-sex peer groups (e.g., Fabes, Martin, & Hanish, 2003; Maccoby, 1998; Powlishta, Serbin, & Moller, 1993). Moreover, boys tend to interact in larger groups whereas girls tend to interact in smaller groups (Maccoby, 1998). Within these groups, boys tend to play using a rough-and-tumble and competitive style whereas girls engage in more frequent conversations and cooperation (Maccoby, 1998). Girls' experiences of working together in small groups may afford them more problem-solving practice compared to boys who are more likely to work independently. Taken together, both strategies would foster age-appropriate relationships which in turn would impact a child's academic achievement (Gauvain, 2001; Parker et al., 2006).

In summary, a mutual friend is a specific type of peer relationship that ensures that reciprocity exists between members of a dyad (Hundley & Cohen, 1999). Mutual friendships can enhance a child's academic achievement by providing interactions that encourage perspective-taking, problem-solving, and vicarious learning (e.g., Gauvain, 2001; Parker et al., 2006). Through the successful development of these skills, prior research indicates children who have a mutual friend are, in turn, more likely to

demonstrate higher levels of academic achievement throughout their school career (e.g., Hoza et al., 1995; Wentzel, 1991).

### **The Interplay Between School Relationships**

The individual effects of both kindergarten student-teacher relationships and the presence of a mutual friend on later academic achievement have been well-established theoretically and empirically (e.g., Downer et al., 2008; Hoza et al., 1995; Pianta & Stuhlman, 2004; Wentzel, 1991). However, research has failed to examine how these school relationships work together to impact academic achievement. When children are at school they are involved in multiple relationships simultaneously. This suggests that examining the interaction of these school relationships may allow a more comprehensive understanding of their joint impact on academic achievement. In particular, it may be that these relationships are compensatory when predicting academic achievement. A compensatory interaction would indicate that as long as children possessed either of these school relationships, they would be successful academically. In other words, having one school relationship would compensate or make-up for a lack in the other school relationship. The current study will explore this interaction. Moreover, the study will explore a potential mechanism through which these early school relationships may affect later academic achievement

### **Perceived Competence as a Mediator for Later Academic Achievement**

Prior research has indicated that kindergarten school relationships are predictive of academic achievement throughout elementary school (Hoza et al., 1995; Pianta & Stuhlman, 2004; Wentzel, 1991). However, the mechanisms that explain this association

have received less attention. One such mechanism that may explain the relation between school relationships and academic achievement is perceived competence. Perceived competence is broadly defined as the child's perception of his or her self in regard to a specific skill or quality (Harter & Pike 1984). Specifically, perceived competence is comprised of two main domains, physical competence and cognitive competence (Harter & Pike, 1984). Perceived physical competence is characterized by the perception that one possesses the physical skills necessary to complete tasks (Harter & Pike, 1984). Cognitive competence is defined as the perception that one possesses the skills necessary to complete mental tasks (Harter & Pike, 1984). Moreover, cognitive competence is necessary to successfully complete tasks involved in the assessment of academic achievement.

Prior research indicates that social relationships at home and school can influence perceived competence. Parental involvement at school has been shown to influence perceived competence such that more parental involvement in second grade is associated with higher levels of perceived cognitive competence at the same time point (Topor, Keane, Shelton, & Calkins, 2010). Moreover, kindergarten student-teacher relationships and mutual friends may impact a child's classroom engagement as well as desire for learning which in turn impact children's levels of academic achievement. In addition, teacher and peer evaluations of a child's perceived competence are predictive of change in child's self-perceived competence (Cole, 1991). This indicates that student-teacher relationships and mutual friends impact perceived competence within the same school year. Further, it may be that early student-teacher relationships and mutual friendships are

predictive of change over-time in a child's self-perceived competence. Specifically, the warmth and support that positive kindergarten student-teacher relationships and mutual friends provide may be more likely to influence the child's evaluation of his or herself as compared to children with a negative student-teacher relationship or the lack of a mutual friend. In addition, the interpersonal feedback received by a child may have more of an impact on the child's perceived competence when this child possesses a positive student-teacher relationship or a mutual friend because the feedback given from these relationships may be more meaningful. Whereas evaluations given to children who have a negative student-teacher relationship or lack a mutual friend may not result in a change in the child's perceived competence (Cole, 1991) because the child may not value the feedback in the same manner.

Research has also documented that perceived competence has a positive association with academic achievement (Chapman, Skinner, & Baltes, 1990; Ladd & Price, 1986; Schunk, 1981; Topor et al., 2010). Specifically, a higher level of perceived competence is associated with higher levels of academic achievement (Chapman et al., 1990; Ladd & Price, 1986; Schunk, 1981; Topor et al., 2010). In addition, perceived competence has been examined as a mediator of academic achievement and other social factors such as parental involvement (Topor et al., 2010). Specifically, Topor et al. demonstrated that perceived cognitive competence fully mediated the association between parental involvement and academic achievement (Topor et al., 2010). However, research has failed to examine how perceived competence may mediate the association between school relationships and academic achievement.

Both teachers and mutual friends may provide a means through which a child's perceived competence develops. Bandura (1977) stated that perceived competence is influenced by performance accomplishments and vicarious experiences. The warmth and support characterized by positive student-teacher relationships (Pianta & Stuhlman, 2004), are likely to foster positive feelings about one's skills or the sense that children can complete a task regardless of the child's true academic abilities. Similarly, children who have a mutual friend are likely to learn vicariously through their mutual friend's experiences (Parker et al., 2006). Thus, children may believe that as long as they are engaging in the same academic behaviors as their mutual friend, then they would succeed academically. This again may foster positive feelings about their own academic skills or an increase in the child's perceived competence. Therefore, by having a positive student-teacher relationship and/or a mutual friend, children are likely to perceive higher levels of competence as compared to children lacking these salient relationships.

### **Goals and Hypotheses of the Proposed Study**

Student-teacher relationships and mutual friends have been identified as important predictors of academic achievement; however, how these relationships operate in conjunction with one another has yet to be investigated. Thus, the current study will enhance the literature by addressing two primary goals. Foremost, the present study will examine the impact of both the student-teacher relationship and the presence of a mutual friend as they interact in kindergarten to predict academic achievement in second grade. The study will then examine the role of perceived competence as a mediating mechanism that may explain the association between the interaction of school relationships and



subsequent academic achievement. Because previous research has used both teacher-reported and standardized measures of academic achievement (e.g. Graziano et al., 2007; Hamre & Pianta, 2001), the current study will assess academic achievement using teacher-report and a standardized measure of academic success to examine if student-teacher relationships and mutual friend presence similarly affect academic achievement across these different measures.

Using a sample of kindergarten and second grade children from an ongoing longitudinal study, the following hypotheses are proposed:

1. Having a positive student-teacher relationship and/or a mutual friend in kindergarten will be associated with higher levels of academic achievement in second grade.
2. There will be a compensatory relation between kindergarten student-teacher relationships and mutual friend presence on second grade academic achievement such that academic risk associated with risk in one relationship (i.e., poor student-teacher relationship) will be diminished in the presence of the other (i.e., mutual friendship).
3. The compensatory relationship will be stronger for boys when they possess a positive student-teacher relationship as they tend to experience more conflict in their relationships with teachers.
4. Perceived competence will mediate the association between the interaction of the kindergarten school relationships (student-teacher relationship and mutual friendship) and second grade academic achievement.

5. The pattern of results will be similar across teacher-report and a standardized measure of academic achievement.

## CHAPTER II

### METHOD

#### **Participants**

The current data was drawn from the larger RIGHT Track data set (Calkins, Dedmon, Gill, Lomax, & Johnson, 2002) and included only those children who had complete data on all variables at all assessment points. Of the 163 participants with a complete dataset, 69 were male (42%) and 94 (58%) were female. Sixty-eight percent were Caucasian, 28% were African American, and 4% were of other ethnicity. At the kindergarten assessment, families were socioeconomically diverse based on Hollingshead (1975) scores ( $M=44.00$ ;  $SD=10.56$ ; See Table 1). Participants in the smaller data set did not differ from the larger data set in regard to sex,  $\chi^2(1, N = 447) = 1.60, p=ns$ , ethnicity,  $\chi^2(1, N = 447) = 1.86, p=ns$ , or SES  $t(446)=.97, p=ns$ .

**Recruitment and attrition.** Children were initially recruited at age 2 to participate in the RIGHT Track longitudinal study. The goal for recruitment was to obtain a sample of children who were at risk for developing future externalizing behavior problems that were representative of the surrounding community in terms of race and socioeconomic status (SES). All cohorts were recruited through child day care centers, the County Health Department, and the local Women, Infants, and Children (WIC) program. Potential participants for cohorts 1 and 2 were recruited at 2-years of age (cohort 1: 1994-1996 and cohort 2: 2000-2001) and screened using the Child Behavior

Checklist (CBCL 2-3; Achenbach, 1992) completed by the mother in order to oversample for externalizing behavior problems. Children were identified as being at risk for future externalizing behaviors if they received an externalizing T-score of 60 or above. Efforts were made to obtain approximately equal numbers of males and females. A total of 307 children were selected. Cohort 3 was initially recruited when infants were 6-months of age (in 1998) for their level of frustration based on laboratory observation and parent report and followed through the toddler period (See Calkins, Dedmon, Gill, Lomax, & Johnson, 2002, for more information). Children whose mother's completed the CBCL at 2-years of age were included in the current study ( $n = 140$ ). Of the entire sample ( $N = 447$ ), 37% of the children were identified as being at risk for future externalizing problems. There were no significant demographic differences between cohorts with regard to gender,  $\chi^2(2, N = 447) = .63, p = .73$ , race,  $\chi^2(2, N = 447) = 1.13, p = .57$ , or 2-year SES,  $F(2, 444) = .53, p = .59$ . Cohort 3 had a significantly lower average 2-year externalizing T-score ( $M = 50.36$ ) compared to cohorts 1 and 2 ( $M = 54.49$ ),  $t(445) = -4.32, p = .00$ .

At 5-years of age 365 children participated in the study. Again, there were no significant differences between families who did and did not participate in terms of gender,  $\chi^2(1, N = 447) = .76, p = .38$ , race,  $\chi^2(1, N = 447) = .17, p = .68$ , 2-year socioeconomic status,  $t(424) = 1.93, p = .06$  and 2-year externalizing T-score ( $t(445) = -1.73, p = .09$ ). At 7-years of age 350 families participated including 19 that did not participate in the 5-year assessment. Again, there were no significant differences between families who did and did not participate in terms of gender,  $\chi^2(1, N = 447) =$

2.12,  $p = .15$ , race,  $\chi^2(3, N = 447) = .60, p = .90$  and 2-year externalizing T-score ( $t(445) = -1.30, p = .19$ ). Families with lower 2-year socioeconomic status, were less likely to continue participation at the 7-year assessment ( $t(432) = 2.61, p < .01$ ).

## Measures

**Student-teacher relationship.** To assess student-teacher relationship quality each participant's kindergarten teacher completed the Student-Teacher Relationship Scale (STRS; Pianta, 2001). This scale consisted of 28 Likert scale questions that assessed the teacher's perception of his/her relationship with the participant. The questionnaire contained three subscales (Conflict, Closeness, and Dependency) as well as an overall relationship scale (See Appendix A for individual items). Because this study was interested in the overall quality of the student-teacher relationship, we only examined the overall scale. The overall relationship scale was calculated using the closeness subscale and reverse scoring for the conflict and dependency subscales (Graziano et al., 2007). This scale was used as a measure of the quality of the student-teacher relationship and has good internal consistency (Cronbach's Alpha=.86).

**Mutual friend.** A sociometric interview in kindergarten was used to determine mutual friendship. The sociometric interview was based on Coie, Dodge, and Coppotelli's (1982) original procedure but has been modified to include an unlimited number of nominations (Terry, 2000). Children were asked, "*Who are the three kids you like to play with the most?*" A child was considered to have a mutual friend if both the RIGHT Track participant and at least one other classmate identified one another as one of their top three friends.

**Teacher-reported academic achievement.** Academic achievement was measured in two ways. The Academic Performance Rating Scale (APRS; DuPaul, Rapport, & Perriello, 1991) was used to measure teacher-reported academic achievement in the child's classroom. The APRS contained 19 items on a five-point Likert scale completed by the teacher to assess classroom academic performance (See Appendix B for individual items). It contains three subscales: impulse control, academic success, and academic productivity. The average of the three subscales was used to measure overall academic achievement in the classroom (Cronbach's Alpha=.94).

**Standardized academic achievement.** The participant's standardized academic achievement was assessed using the Wechsler Individual Achievement Test®-Second Edition (WIAT-II). The WIAT-II (Wechsler, 1992) was administered to participants in second grade by trained clinical graduate students who were blind to the purpose of the study. For the purposes of this study, the Reading Composite and Mathematics Composite were used. The Reading composite included tasks that assessed the child's basic reading and reading comprehension skills. The Mathematics Composite contained items that assessed the child's ability to solve applied word problems and pencil and paper problems using arithmetic skills.

**Intelligence.** Children's intelligence was calculated using the Wechsler Intelligence Scale for Children®-Third Edition (WISC-III). The WISC-III (Wechsler, 1991) was administered by trained clinical graduate students to all second grade participants. The Full Scale IQ, which is a standardized score, was used as an index of the child's intellectual potential against same age peers.

**Perceived competence.** Perceived competence was examined in second grade using The Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (PSPCSC; Harter & Pike, 1984). This measure contained 24 items assessing perceived cognitive competence, perceived physical competence, peer social acceptance, and maternal social acceptance (See Appendix C for individual items). Harter and Pike (1984) recommend using only the perceived cognitive competence and perceived physical competence subscales when assessing a child's overall perceived competence. The current study followed this recommendation and used the average between the two respective subscales (Cronbach's Alpha=.77).

## CHAPTER III

### RESULTS

#### **Preliminary Analyses**

Descriptive statistics are provided in Table 2 for all study variables. Study variables were adequately and normally distributed. Preliminary analyses assessed significant differences between demographic and study variables. T-tests were conducted to examine differences between study variables and gender. The results yielded no gender differences for study variables. A one-way ANOVA was conducted to assess differences between ethnicity and variables of interest. Results indicated that there were significant differences between ethnicities on the Full Scale IQ score,  $F(2,160)=16.96, p<.05$ , the Reading Composite,  $F(2,160)=3.16, p<.05$ , the Math Composite,  $F(2,160)=2.63, p<.05$ , and the APRS,  $F(2,160)=6.67, p<.05$ . Post hoc comparisons indicated that Caucasians scored significantly higher than African Americans in regard to their Full Scale IQ score (Caucasians:  $M=114.03, SD=13.50$ ; African Americans:  $M=100.57, SD=12.87$ ), the Reading Composite (Caucasians:  $M=114.07, SD=16.72$ ; African Americans:  $M=107.54, SD=12.77$ ), and the Math Composite (Caucasians:  $M=109.16, SD=17.01$ ; African Americans:  $M=102.41, SD=16.11$ ). Similarly, Caucasians performed significantly higher ( $M=3.99, SD=.62$ ) than African Americans ( $M=3.59, SD=.74$ ) on the APRS. There were no significant differences between other ethnicities and measures of academic achievement. In addition, there were no significant differences between ethnicity and



student-teacher relationship, mutual friends, or perceived competence. Because the total variance explained by ethnicity across the Reading Composite ( $R^2=.03$ ), the Math Composite, ( $R^2=.02$ ), and the APRS ( $R^2=.06$ ), outcome measures was low and because the power to detect differences would be compromised, it was not controlled for in subsequent analyses.

Correlations were conducted between SES and study variables. Socioeconomic status at age 5 was significantly correlated with the Full Scale IQ score,  $r=.33$ ,  $p<.05$ , the Reading Composite,  $r=.21$ ,  $p<.05$ , and the Math Composite,  $r=.16$ ,  $p<.05$ . There were no significant correlations between other study variables and SES. Because the total variance explained by SES across the Reading Composite ( $R^2=.04$ ) and Math Composite ( $R^2=.03$ ) the power to detect differences would be compromised, it was not controlled for in subsequent analyses.

### **Bivariate Analyses**

Correlations between all study variables were examined (See Table 3). As expected, the kindergarten student-teacher relationship was significantly and positively correlated with both the presence of a mutual friend and with teacher-reported academic achievement in second grade. Moreover, student-teacher relationships were significantly and positively correlated with the Reading Composite. Similarly, having a mutual friend was significantly and positively correlated to teacher-reported academic achievement. The Full Scale IQ score was significantly and positively correlated with the Reading Composite, Math Composite, and APRS. Perceived competence was also significantly and positively correlated with the Reading and Math Composite scores. Because the

magnitude of the correlation between the Full Scale IQ score and the Reading and Math Composite scores was large, it will be controlled for in analyses involving these outcome measures. The magnitude of the remaining significant correlations did not suggest problems with multicollinearity.

### **Hierarchical Regression Analyses**

A series of hierarchical regression analyses were conducted to examine the associations between kindergarten student-teacher relationships, the presence of a mutual friend in kindergarten, and the interaction of these school relationships in predicting second grade academic achievement. These regressions were conducted three times, once predicting teacher-reported academic achievement via the APRS and twice predicting a standardized measure of academic achievement via the Reading Composite and Math Composite scores, respectively. In regard to the APRS, no control variables were entered because there were no significant differences between demographic (sex, ethnicity, SES) and study variables. However, IQ and SES were controlled for in analyses involving the Reading and Math Composite scores. In step 1 of the regression analysis for the APRS the main effects of kindergarten student-teacher relationships and mutual friend presence were entered. In step 2 of this analysis, the interaction between these school relationships was entered. In step 1 of the regression analyses for the Reading and Math Composite score the control variables of SES and IQ were entered. In step 2 of this analysis, the main effects of kindergarten student-teacher relationships and mutual friend presence were entered. In step 3, the interaction between kindergarten school relationships were entered.

Prior to creating the interaction term, the student-teacher relationship and mutual friend presence were standardized. The standardized student-teacher relationship and mutual friend variables were then multiplied to create the interaction variable for school relationships. This product-term was then entered in the appropriate step of the regression analyses. Post-hoc analyses of significant interactions were conducted with Preacher's online tool for assessing two-way interactions (Preacher, Curran, & Bauer, 2006). The region of significance for variables was set for  $\alpha=.05$ . Simple slopes analyses were conducted to determine if the slope plotted was significantly different from zero. The simple slopes analyses also indicate if there is a difference in the association between the independent and dependent variables contingent on the presence or absence of a mutual friend in kindergarten (Aiken & West, 1991; Frazier, Tix, & Barron, 2004).

**Teacher-reported academic achievement.** In step 1 of the model, the kindergarten student-teacher relationship was a significant predictor of teacher-reported academic achievement ( $b=.02, p<.01$ ). However, the main effect for number of mutual friends was not a significant predictor of teacher-reported academic achievement ( $b=.19, p=ns$ ). In step 2, the interaction between the kindergarten student-teacher relationship and mutual friend presence was a significant predictor of academic achievement above and beyond either relationship independently ( $b=.10, p<.05$ ; See Table 4).

Given the significant interaction between the school relationships in kindergarten and second grade academic achievement, a simple slopes analysis was conducted. The analysis revealed that the line representing children who do not have a mutual friend is significantly different from zero ( $b=.02, p<.05$ ). Similarly, the line representing children

who possess one to three mutual friends is significantly different from zero ( $b=.10$ ,  $p<.05$ ; See Figure 1 for pictorial representation).

**Standardized academic achievement.** The second analysis examined if the same school relationships in kindergarten predicted academic achievement via the Reading Composite score. This regression analysis followed the same steps as the previous model. However, in step 1 of the analysis, control variables of IQ and SES were entered followed by each school relationship independently in step 2 and the interaction of the relationships entered in step 3. As expected, in step 1 of the model, the Full Scale IQ ( $b=.68$ ,  $p<.05$ ) score was a significant predictor of the Reading Composite; SES was not a significant predictor of the Reading Composite (see Table 5). In step 2 of the model, again the Full Scale IQ score ( $b=.66$ ,  $p<.05$ ) was a significant predictor of the Reading Composite; no other variables were significant predictors of the Reading Composite score. The same pattern was exhibited in step 3 of the regression analysis, only the Full Scale IQ score ( $b=.66$ ,  $p<.05$ ) was a significant predictor of the Reading Composite score.

The third regression analysis using the Math Composite score as the outcome variable followed the same steps as the regression for the Reading Composite. Again, in step 1, the Full Scale IQ ( $b=.67$ ,  $p<.05$ ) was a significant predictor of the Math Composite score (See Table 5). Similarly, in steps 2 and 3 of the analysis, the Full Scale IQ score was the only significant predictor of the Math Composite (step 2:  $b=.66$ ,  $p<.05$ ; step 3:  $b=.66$ ,  $p<.05$ ).

## **Mediation Analysis**

The current study also examined perceived competence as a mediator between kindergarten school relationships and second grade teacher-reported academic achievement. The mediation analysis followed Baron and Kenny's (1986) mediational analysis model, which requires several regressions to be performed. First, the path between the interaction of kindergarten school relationships (student-teacher relationship X mutual friend) and teacher-reported academic achievement is assessed. If significant, the path between the interaction of school relationships and perceived competence is then assessed. Lastly, the path between perceived competence and academic achievement is assessed. For full mediation, the regression must show that after controlling for perceived competence, the interaction of the school relationships no longer significantly predicts academic achievement. For partial mediation, the effect of the interaction of school relationships on academic achievement must be reduced while still remaining significant, even after controlling for perceived competence. The Sobel (1982) test is used to test the magnitude and significance of any reduction in the interaction's effect on academic achievement.

According to Baron and Kenny (1986) the first regression must demonstrate that the path between the school relationships and teacher-reported academic achievement is significant. The regression analysis indicated that the interaction between these kindergarten school relationships was a significant predictor of teacher-reported academic achievement ( $b=.18, p<.05$ ; See Table 6). The next step must demonstrate that the kindergarten school relationships were a significant predictor of perceived

competence. This regression analysis indicated that kindergarten school relationships were not a significant predictor of perceived competence ( $b=.04$ ,  $p<ns$ ). Because this path was not significant, the mediation analysis cannot be continued (Baron & Kenny, 1986).

## CHAPTER IV

### DISCUSSION

A child's ability to successfully navigate school involves success in many domains including social, behavioral, and academic. Academic achievement has been cited as an important foundational skill for later success (Arbona, 2000; Cairns & Cairns, 1994; Garnier et al., 1997). Being successful in one grade can lead to success in the next and set the stage for a promising educational career. Unfortunately not all children achieve academic success in school. According to a 2007 US Department of Education national census, 19% of fourth grade students demonstrated below average basic math skills and 34% below basic reading skills (U.S. Department of Education, 2007).

Past research has examined specific relationships that facilitate academic achievement in elementary school. These have included parent-child relationships (e.g., Topor et al., 2010), student-teacher relationships (e.g., Hamre & Pianta, 2001), and peer relationships (e.g., Wentzel, 1991). However, past research has neglected to address how these relationships may work together to predict a child's later academic achievement. Thus, the primary goal of this study was to examine the extent to which kindergarten student-teacher relationships and the presence of a kindergarten mutual friend interact to predict academic achievement above and beyond the simple main effects of these relationships independently. This question was examined using both a teacher-report and a standardized measure of academic achievement to discern if student-teacher

relationships and mutual friends impact different measures of academic achievement. It was predicted that the interaction between kindergarten school relationships would predict academic achievement above and beyond either relationship independently. In addition, the second goal of this study was to examine a child's perceived competence as a mechanism through which these relationships influence a child's academic achievement. Moreover, based on extant literature it was predicted that perceived competence would partially mediate the relation between these kindergarten school relationships and second grade academic achievement.

The results of the present study contribute to existing research on the influence of early school relationships on later academic achievement. We found that the student-teacher relationship was significantly associated with later academic achievement, as reported by an independent teacher, two years after the initial assessment period. Thus, children who had a positive student-teacher relationship in kindergarten demonstrated significantly higher levels of teacher-reported academic achievement compared to children without these relationships. The relation between a child's early student-teacher relationship and later academic achievement suggests that when examining kindergarten relationships independently, the student-teacher relationship plays an important role when examining later teacher-reported academic achievement. Further, this finding is consistent with previous research examining the predictive effects of student-teacher relationships (e.g., Hamre & Pianta, 2001; Jermore et al., 2009). Past research has theorized that children who have positive relationships with their teachers are more likely to be motivated to learn from their teacher and subsequently earn their praise (Hamre &



Pianta, 2001; Urdan & Maehr, 1995). In addition, children with positive relationships with their teachers engage in more meaningful and more frequent interactions with the teacher (Pianta & Stuhlman, 2004). These results further support this literature, illustrating the impact of the kindergarten student-teacher relationship on subsequent academic achievement, as rated by children's second grade teacher. Taken together this indicates that children who have good relationships with their teachers are able to interact with their teacher in an effective manner which in turn increases their academic achievement.

However, this effect was only found for teacher-report of academic achievement. It may be that when teachers assess a child's academic achievement they take into consideration other child behaviors in addition to objective grades. For example, in addition to earning a grade on a particular assignment, children may also earn credit for turning in the assignment, completing the entire assignment, and working on the assignment in class. These additional child behaviors may influence the teacher's perception of the child's academic achievement. However, when assessing academic achievement through a standardized measure, these additional child behaviors are not directly involved in deriving a score and thus do not impact academic achievement through this measure. This may suggest that, in fact, teacher-reported academic achievement and standardized academic achievement are two different constructs. Future research should consider using multiple measures and reporters of a child's academic achievement to assess a latent construct of academic achievement. Further, these studies could investigate the influence of early school relationships on more comprehensive

measures of academic achievement as both success in the classroom and success on standardized tests are necessary for long-term academic success.

When examining the independent influence of mutual friendships on academic achievement, a significant effect was not found regardless of whether teacher-reported academic achievement or standardized scores were assessed. This is in contrast to previous work which has indicated that children who have close friends are more likely to demonstrate higher levels of academic achievement (Wentzel, 1991) as compared to children without mutual friends (e.g., Hoza et al., 1995). Prior research assessed mutual friends in third through fifth grades (Hoza et al., 1995) whereas the present study measured mutual friends in kindergarten. It may be that younger children have more difficulties identifying their mutual friends, particularly when children have to identify only their top three friends. Kindergarten children may have more difficulties narrowing down their top three friends because they have just entered formal schooling and been introduced to other new children. Thus, assessing mutual friendships later in the kindergarten year or in later elementary school may allow for children to have better established their top three mutual friends.

Another possibility may be the use of a dichotomous classification of mutual friend. The mutual friend variable was created dichotomously with a zero representing children who possessed no mutual friends whereas a one represented children with one to three mutual friends. The presence or absence of a mutual friend may not be a meaningful cut-off to assess mutual friendships. It may be that there is a qualitative difference between children who possess zero or one mutual friend compared to children who

possess two or three mutual friends. Moreover, it may also be that limiting the number of “best-friend” nominations to three negatively impacts children’s abilities to identify and be identified as mutual friends.

Past research has suggested that peers can facilitate academic achievement through several different modalities including vicarious learning, problem-solving, and perspective-taking (e.g., Gauvain, 2001; Parker et al., 2006). It may be that children need more than one other friend to effectively engage in the aforementioned skills. Therefore, future research should consider assessing mutual friendships with a different operationalization to further our understanding of assessment and measurement of mutual friendships. Moreover, given that mutual friends served as a proxy for a close and reciprocated peer, to some degree this may imply a good relationship quality between the members of the dyad. It may be that friendship quality may better account for performance on academic measures as opposed to the mere presence of a mutual friend. Specifically, children whose mutual friendship quality is low may be less apt to model the academic behaviors of this friend. Conversely, a child who has a higher quality mutual friendship may be more likely to model the behaviors of this friend because this relationship is more supportive, warm, and encouraging. Further, a consideration of the characteristics of the mutual friend may be necessary in understanding the impact of this relationship on academics. A child who has a prosocial mutual friend may be more likely to learn adaptive skills in the classroom whereas a deviant mutual friendship may promote disruptive behaviors in the classroom. For example, the child may learn and model maladaptive behaviors from his or her deviant mutual friend such as not turning

homework in or being distracted in class. Thus, when conducting future studies, researchers should consider the role of mutual friendship quality and mutual friend characteristics in assessing mutual friendships.

Both children's relationships with their teachers and their relationships with their mutual friends in kindergarten have been extensively studied independently. This study is novel in that it sought to extend previous research and examine how these relationships work together when predicting the same academic outcomes. Given that there was only a main effect for the student-teacher relationship and not for mutual friend presence, this interaction suggests something unique about the combination of these particular relationships. The present study demonstrated that the interaction between these kindergarten school relationships predicted teacher-reported academic achievement above and beyond the effects of either relationship independently. In other words, when examining children's academic achievement in second grade, it is best to examine the child's relationship with his or her teacher as well as the presence or absence of a mutual friend. Specifically, this interaction indicated that children who had a positive relationship with their teacher and at least one mutual friend demonstrated the highest levels of academic achievement. Conversely, children who had a negative student-teacher relationship and no mutual friends demonstrated the lowest levels of academic achievement. Children who have at least one friend and also possess a positive relationship with their teacher have access to more than one individual at school when they experience difficulties with academics and may learn vicariously from interactions within these relationships. Thus, children who possess both these relationships are

provided with early support which facilitates the development of later academic achievement. Similarly, children who possess no mutual friends are further impacted by the support of their student-teacher relationship resulting in long-term academic achievement improvements, but not to the same degree as children who possess a mutual friend. It may be that children without mutual friendships have an underlying deficit in skills that would also hinder the development of positive student-teacher relationships. For example, children who are unable to practice social skills with mutual friends would then be unable to effectively use these skills to develop relationships with their teacher. Further, children who are shy may have more difficulties developing mutual friendships or student teacher-relationships. Taken together, there may be a unique characteristic about children without mutual friendships that prevent them from further benefitting from student-teacher relationships. Further research is needed to clarify the nature of these children.

As mentioned earlier, there were no significant relations between kindergarten school relationships, independently or as an interaction, when predicting academic achievement with standardized tests. This was contrary to the hypotheses of this study, and these findings may be due to the fact that the two measures of academic achievement, teacher report versus standardized measures of children's performance, may be assessing different components of academics and may be influenced differentially. It may be that standardized measures of academic achievement are confounded with other difficulties such as reading delays or a lack of familiarity with standardized tests. Specifically, participants in this sample do not begin to take end of grade exams or other standardized

school assessments until third grade. Therefore, these students have not been exposed to standardized tests in the school context. This further indicates that there is something unique about the children who have been exposed to standardized testing prior to third grade in this sample. Thus, standardized measures of academic achievement may be a more useful measure in later elementary school (after third grade) because children will have had more time to correct any skill delays and become more familiar with the standardized assessment procedures.

Moreover, the environment that a child demonstrates their achievement in is different across these domains and may affect the child differently. For example, when children's academic achievement is assessed by their teacher, the child has been able to develop a relationship with the teacher and is taught the content that the teacher dictates and thinks is important. In addition, children are further able to practice these skills using multiple modalities which could include group activities or homework, both of which may involve interaction with a classmate. Thus, when the child is being assessed for their achievement in a more school-based setting, teachers and peers may have influence over the outcome. Conversely, when children are taking standardized tests in second grade they likely have had no direct experience practicing for these tests. Rather, they are tasked to apply the knowledge they do possess to a more novel situation. Moreover, these standardized achievement tests are administered in a one-on-one setting as opposed to a group setting. This may produce more anxiety and uneasiness in the child and may affect his or her performance. Thus, because this measure was not more school based, the

relationships may not affect more standardized measures of academic achievement in the same manner as a more school-based or teacher-reported measure.

Another possibility is that there may not have been a wide range of variability in the standardized academic achievement measure in second grade. Because children in second grade have only been exposed to one full year of formal schooling, they may not have as much knowledge to demonstrate on achievement tests. As such, continued assessments of academic achievement further into schooling would be hypothesized to be influenced by these early school relationships as children's knowledge will continue to build on their early academics in school. With increased schooling, more variability is expected in standardized assessments of achievement as children continue to build on either strengths or weaknesses in their academics.

A specific mechanism explored in the current study was perceived competence. It was predicted that early school relationships would increase children's perceptions of their academic and social competence, thereby increasing academic achievement. It was hypothesized that a child's perceived competence would mediate the relation between the interaction of school relationships and teacher reported academic achievement. However, the results did not support this conclusion because the interaction was not a significant predictor of perceived competence. One limitation is that perceived competence was measured at the same time point as the child's academic achievement as opposed to being measured between the assessment of school relationships and the assessment of academic achievement. Moreover, perceived competence has been defined as the perception on one's ability of a skill or task (Harter & Pike, 1984). Since this was measured in second

grade, a child's cognitive abilities may not be developed enough to have accurate insight over his or her own abilities. If the child is unable to accurately label or identify his or her perceived competence the child may then rely on their teachers and peer's perceptions of their skills. Young children may have difficulty self-reflecting to identify competencies and therefore rely on feedback from teachers and friends about their strengths and weaknesses. Thus, student-teacher and mutual friend relationships may be in and of themselves indicators of perceived competence for young children.

In addition there may be some concerns about the measure used to assess perceived competence in this sample. Specifically, the measure was only significantly correlated to the standardized assessment scores. This would suggest that perceived competence would only influence the outcome on standardized achievement measures. Moreover, this would suggest that perceived competence is not influenced by school relationships. This is in contrast to previous work that demonstrates that parental factors, such as parental involvement, can influence children's perceived competence in second grade (Topor et al., 2010). However, Topor and colleagues (2010) used a cross-sectional design which indicates that parental involvement in second grade is associated with perceived competence in second grade. This may suggest that school relationships may only impact perceived competence during a concurrent time point. The current study assessed perceived competence as a mediator between the interaction of kindergarten school relationships and second grade teacher-reported academic achievement. Future research may benefit from examining how late elementary school relationships independently predict concurrent perceived competence. Once this relation is better



understood, studies could then assess the long-term impact of school relationships on perceived competence and its role as a mediator of later school success.

Another potential mechanism that may explain the association between kindergarten school relationships and academic achievement are social skills. Children who have effective social skills may be able to utilize these skills across contexts and groups. This would then lead children to develop and maintain meaningful friendships with their classmates, as well as developing relationships with their teachers.

Furthermore, it may be that the absence or presence of a mutual friend dictates the effect of student-teacher relationships because children who possess at least one mutual friend are able to practice their social skills with same-aged peers and receive feedback prior to interacting with their teacher. Once the child initiates an interaction with the teacher, they may then have the necessary social skills to interact effectively and thus begin the development of a positive student-teacher relationship. In culmination, these skills may help children to manage more difficult times and facilitate seeking help during these times.

In addition, children who have more advanced social skills may also possess other abilities related to school success such as executive functioning which has been demonstrated to develop along a similar timeline as social skills (Pennington & Ozonoff, 1996; Welsh & Pennington, 1988). It may be that children who enter kindergarten with more advanced cognitive and executive function skills are able to more efficiently develop advanced social skills and utilize these skills across contexts. On the other hand, a child's executive functioning abilities may not be related to their social skills, but may

still help explain the results of this study. Children with more advanced cognitive skills simply may tend to demonstrate higher levels of academic achievement. By having an innate cognitive advantage, these children may be more liked by their teachers because they may understand the material better, ask questions, and participate in class more frequently than children who are at a disadvantage cognitively. Similarly, these same children may be more liked by their peers for similar reasons mentioned above. In turn, this may foster a higher frequency and quality of friendships. By combining the above two situations, the interaction between these school relationships could likely be explained by a child's cognitive abilities.

### **Limitations and Future Directions**

This study extended the literature by demonstrating that there is a unique interaction that occurs between student-teacher relationships and the presence of mutual friends in kindergarten when predicting second grade academic achievement. While this finding is novel and extends beyond prior research on early school relationships, the present study was unable to identify a mechanism through which the association occurred. Thus, future research could extend these findings by addressing other potential mediators of this relation which could include a child's social skills and cognitive abilities. Moreover, given the proposed rationale for both mechanisms, these potential mediators could be compared to one another to see if one model explains the relation significantly better than the other.

An additional point for consideration is the most appropriate way to operationalize a mutual friend. The present study defined a mutual friend using a

reciprocal nomination sociometric procedure that allowed for a child to have zero to three mutual friends. However, the present study did not address the quality of the nominated mutual friendships, nor did it address any meaningful differences between the numbers of mutual friends. Future research could examine the effects of varying numbers of mutual friends on academic achievement to better identify a meaningful cutoff when predicting academic achievement. In addition, future research could incorporate the use of friendship quality and friendship characteristics in the operationalization of a mutual friend.

Lastly, this study was unable to find a significant relation between school relationships and a standardized measure of academic achievement. Examining academic achievement via standardized measures may serve more utility as children advance in school and have more knowledge to demonstrate. Thus, future research could examine this limitation by using a more comprehensive method of assessing academic achievement as well as by using these more traditional measures in an older sample of children. It would be of particular interest to examine how these same early relationships may predict similar or different patterns of academic achievement at different time points throughout a child's academic career.

### **Summary and Conclusions**

Overall, the present study demonstrated that, when examining the predictive power of kindergarten school relationships independently, a child's relationship with their teacher is a significant predictor of later academic achievement. Specifically, children who have warmer relationships with their teachers tend to demonstrate higher

levels of academic achievement. However, contrary to past research, the presence of a mutual friend was not a significant predictor of academic achievement. The aforementioned associations have already been established in previous research (e.g., Hamre & Pianta, 2001; Wentzel, 1991), but the extent to which early school relationships work together has not been established. Thus, the current study demonstrated that the presence of a mutual friend plays a unique role in determining a child's academic achievement by interacting with the child's relationship with their teacher. Specifically, this interaction demonstrated that children who possess both a positive student-teacher relationship and a mutual friend demonstrated the highest levels of academic achievement. Moreover, the interaction yielded that academic achievement for children who possess or don't possess a mutual friend is further impacted by the quality of the relationship with their teacher.

This research indicates that when examining children within the school context, it is important to examine the extent to which multiple relationships at school are influential. Past research has relied solely on one relationship or the other as the means for predicting academic achievement. However, this study demonstrated that relationships with teachers and peers interact in a unique manner for predicting a child's achievement. This indicates that future research should not only include both relationships, but should explore other influential figures at school. Moreover, because these early school relationships are influential for later school success, academic institutions should consider the extent to which they are promoting healthy social development with both teachers and peers in addition to academic development.

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## APPENDIX A. STUDENT-TEACHER RELATIONSHIP SCALE

### STUDENT – TEACHER RELATIONSHIP SCALE

Robert C. Pianta

Child: \_\_\_\_\_ Teacher: \_\_\_\_\_ Grade: \_\_\_\_\_

*Please reflect on the degree to which each of the following statements currently applies to your relationship with this child. Using the scale below, circle the appropriate number for each item.*

Definitely does not apply 1	Not really 2	Neutral not sure 3	Applies somewhat 4	Definitely applies 5	
1. I share an affectionate, warm relationship with this child.	1	2	3	4	5
2. This child and I always seem to be struggling with each other.	1	2	3	4	5
3. If upset, this child will seek comfort from me.	1	2	3	4	5
4. This child is uncomfortable with physical affection or touch from me.	1	2	3	4	5
5. This child values his/her relationship with me.	1	2	3	4	5
6. This child appears hurt or embarrassed when I correct him/her.	1	2	3	4	5
7. When I praise this child he/she beams with pride.	1	2	3	4	5
8. This child reacts strongly to separation from me.	1	2	3	4	5
9. This child spontaneously shared information about himself/herself.	1	2	3	4	5
10. This child is overly dependent on me.	1	2	3	4	5
11. This child easily becomes angry with me.	1	2	3	4	5
12. This child tries to please me.	1	2	3	4	5
13. This child feels that I treat him/her unfairly.	1	2	3	4	5
14. This child asks for my help when he/she really does not need help.	1	2	3	4	5
15. It is easy to be in tune with what this child is feeling.	1	2	3	4	5
16. This child sees me as a source of punishment and criticism.	1	2	3	4	5
17. This child expresses hurt or jealousy when I spend time with other children.	1	2	3	4	5
18. This child remains angry or is resistant after being disciplined.	1	2	3	4	5
19. When this child is misbehaving, he/she responds well to my look or tone of voice.	1	2	3	4	5
20. Dealing with this child drains my energy.	1	2	3	4	5
21. I've noticed this child copying my behavior or ways of doing things.	1	2	3	4	5
22. When this child is in a bad mood, I know we're in for a long and difficult day.	1	2	3	4	5
23. This child's feelings toward me can be unpredictable or can change suddenly.	1	2	3	4	5
24. Despite my best efforts, I'm uncomfortable with how this child and I get along.	1	2	3	4	5
25. This child whines or cries when he/she wants something from me.	1	2	3	4	5
26. This child is sneaky or manipulative with me.	1	2	3	4	5
27. This child openly shares his/her feelings and experiences with me.	1	2	3	4	5
28. My interactions with this child make me feel effective and confident.	1	2	3	4	5

## APPENDIX B. ACADEMIC PERFORMANCE RATING SCALE

### ACADEMIC PERFORMANCE RATING SCALE

Name \_\_\_\_\_  
ID \_\_\_\_\_  
School \_\_\_\_\_

For each of the below items, please estimate the above student's performance over the **PAST WEEK**. For each item, please circle one choice only.

- |    |   |                        |                                |                |                                |                              |
|----|---|------------------------|--------------------------------|----------------|--------------------------------|------------------------------|
| 1. | Estimate the percentage of written <b>math</b> work <i>completed</i> (regardless of accuracy) relative to classmates.                                       | 0-49%<br>1             | 50-69%<br>2                    | 70-79%<br>3    | 80-89%<br>4                    | 90-100%<br>5                 |
| 2. | Estimate the percentage of written <b>language arts</b> work <i>completed</i> (regardless of accuracy) relative to classmates.                              | 0-49%<br>1             | 50-69%<br>2                    | 70-79%<br>3    | 80-89%<br>4                    | 90-100%<br>5                 |
| 3. | Estimate the <i>accuracy</i> of completed written <b>math</b> work (i.e., percent correct of work done).  | 0-64%<br>1             | 65-69%<br>2                    | 70-79%<br>3    | 80-89%<br>4                    | 90-100%<br>5                 |
| 4. | Estimate the <i>accuracy</i> of completed written <b>language arts</b> work (i.e., percent correct of work done).   | 0-64%<br>1             | 65-69%<br>2                    | 70-79%<br>3    | 80-89%<br>4                    | 90-100%<br>5                 |
| 5. | How consistent has the quality of this child's academic work been over the past week?   | Consistently Poor<br>1 | More Poor than Successful<br>2 | Variable<br>3  | More Successful than Poor<br>4 | Consistently Successful<br>5 |
| 6. | How frequently does the student accurately follow teacher instructions and/or class discussion during <i>large-group</i> (e.g., whole class) instruction?   | Never<br>1             | Rarely<br>2                    | Sometimes<br>3 | Often<br>4                     | Very Often<br>5              |
| 7. | How frequently does the student accurately follow teacher instructions and/or class discussion during <i>small-group</i> (e.g., reading group) instruction? | Never<br>1             | Rarely<br>2                    | Sometimes<br>3 | Often<br>4                     | Very Often<br>5              |

CONTINUED ON BACK → →

8.	How quickly does this child learn new material (i.e., pick up novel concepts)?	Very Slowly 1	Slowly 2	Average 3	Quickly 4	Very Quickly 5
9.	What is the quality or neatness of this child's handwriting?	Poor 1	Fair 2	Average 3	Above Average 4	Excellent 5
10.	What is the quality of this child's reading skills?	Poor 1	Fair 2	Average 3	Above Average 4	Excellent 5
11.	What is the quality of this child's speaking skills?	Poor 1	Fair 2	Average 3	Above Average 4	Excellent 5
12.	How often does the child complete written work in a careless, hasty fashion?	Never 1	Rarely 2	Sometimes 3	Often 4	Very Often 5
13.	How frequently does the child take more time to complete work than his/her classmates?	Never 1	Rarely 2	Sometimes 3	Often 4	Very Often 5
14.	How often is the child able to pay attention without you prompting him/her?	Never 1	Rarely 2	Sometimes 3	Often 4	Very Often 5
15.	How frequently does this child require your assistance to accurately complete his/her academic work?	Never 1	Rarely 2	Sometimes 3	Often 4	Very Often 5
16.	How often does the child begin written work prior to understanding the directions?	Never 1	Rarely 2	Sometimes 3	Often 4	Very Often 5
17.	How frequently does this child have difficulty recalling material from a previous day's lesson?	Never 1	Rarely 2	Sometimes 3	Often 4	Very Often 5
18.	How often does the child appear to be staring excessively or "spaced out"?	Never 1	Rarely 2	Sometimes 3	Often 4	Very Often 5
19.	How often does the child appear withdrawn or tend to lack an emotional response in a social situation?	Never 1	Rarely 2	Sometimes 3	Often 4	Very Often 5

# APPENDIX C. THE PICTORIAL SCALE OF PERCEIVED COMPETENCE AND SOCIAL ACCEPTANCE IN YOUNG CHILDREN

ID#: \_\_\_\_\_

The Pictorial Scale of Perceived Competence  
and Acceptance for Young Children  
Individual Recording and Scoring Sheet, Form 1<sup>st</sup> & 2<sup>nd</sup> grade

Child's Name \_\_\_\_\_ Age \_\_\_\_\_

Gender M F Class Grade \_\_\_\_\_ Testing Date \_\_\_\_\_

Item Order and Description	Cognitive Competence	Peer Acceptance	Physical Competence	Maternal Acceptance
1. Good at numbers	1. _____			
2. Has lots of friends		2. _____		
3. Good at swinging			3. _____	
4. Mom lets you eat at friend's house				4. _____
5. Knows things in school	5. _____			
6. Kids share toys with you		6. _____		
7. Good at climbing			7. _____	
8. Mom takes you places				8. _____
9. Good at reading	9. _____			
10. Has friends to play with		10. _____		
11. Good at bouncing ball			11. _____	
12. Mom cooks favorite foods				12. _____
13. Good at writing words	13. _____			
14. Has friends on playground		14. _____		
15. Good at skipping			15. _____	
16. Mom reads to you				16. _____
17. Good at spelling words	17. _____			
18. Gets asked to play by others		18. _____		
19. Can run fast			19. _____	
20. Mom lets you stay overnight at friend's				20. _____
21. Good at adding numbers	21. _____			
22. Kids want to sit next to you		22. _____		
23. Good at jump rope			23. _____	
24. Mom talks to you				24. _____
Column (Subscale) Total	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Column (Subscale) Mean (Total Divided by 6)	_____	_____	_____	_____

Comments: \_\_\_\_\_



## APPENDIX D. TABLES AND FIGURES

Table 1

*Descriptive Statistics for Demographic Measures*

Variable	N	%	M	SD	Minimum	Maximum
<i>Child Gender</i>						
Male	69	42				
Female	94	58				
<i>Ethnicity</i>						
African	46	28				
American						
Caucasian	110	68				
Other	7	4				
Hollingshead (SES)- Kindergarten	158*		44.00	10.56	14.00	66.00

\*If at least one parent's education level or job title is not reported the Hollingshead score cannot be computed. In the present studies, five participants did not report on parent education level or job title.

Table 2

*Descriptive Statistics for Study Variables*

Measure	N	%	Mean	Standard Deviation	Min.	Max.	Kurtosis	Skewness
Mutual Friend (Present)	119	73	-	-	-	-	-	-
Mutual Friend (Absent)	44	27	-	-	-	-	-	-
STRS	163	-	115.20	12.35	62.50	131.00	2.53	-1.50
WIAT Reading Composite	163	-	111.93	15.93	76	143	-.82	-.11
WIAT Math Composite	163	-	107.21	16.96	25	153	2.75	-.39
IQ	163	-	109.87	14.57	65	139	-.37	-.20
APRS	163	-	3.85	0.69	1.94	5.00	.03	-.83
PSPCSC	163	-	3.50	.39	1.58	4.00	3.24	-1.42

Table 3

*Zero Order Correlation Matrix for Independent Variables*

Variable	1	2	3	4	5	6	7
1. STRS	1	-	-	-	-	-	-
2. Mutual Friend	.16*	-	-	-	-	-	-
3. IQ	.11	-.07	-	-	-	-	-
4. Reading	.18*	.03	.62**	-	-	-	-
Composite							
5. Math Composite	.12	.00	.57**	.55**	-	-	-
6. APRS	.35**	.18*	.38**	.53**	.35**	-	-
7. PSPCSC	.04	-.04	.12	.28**	.17*	.08	-

\* $p < .05$ ; \*\* $p < .01$

Table 4

*Summary of Hierarchical Regression Analysis for Teacher Reported Academic Achievement via the APRS.*

	$\beta$	$R^2$	$\Delta R^2$
Step 1		.14**	
STRS	.33**		
Mutual Friend	.12		
Step 2		.17*	.03*
STRS	.41		
Mutual Friend	.17		
STRS x Mutual Friend	.18*		

\* $p < .05$ ; \*\* $p < .01$

Table 5

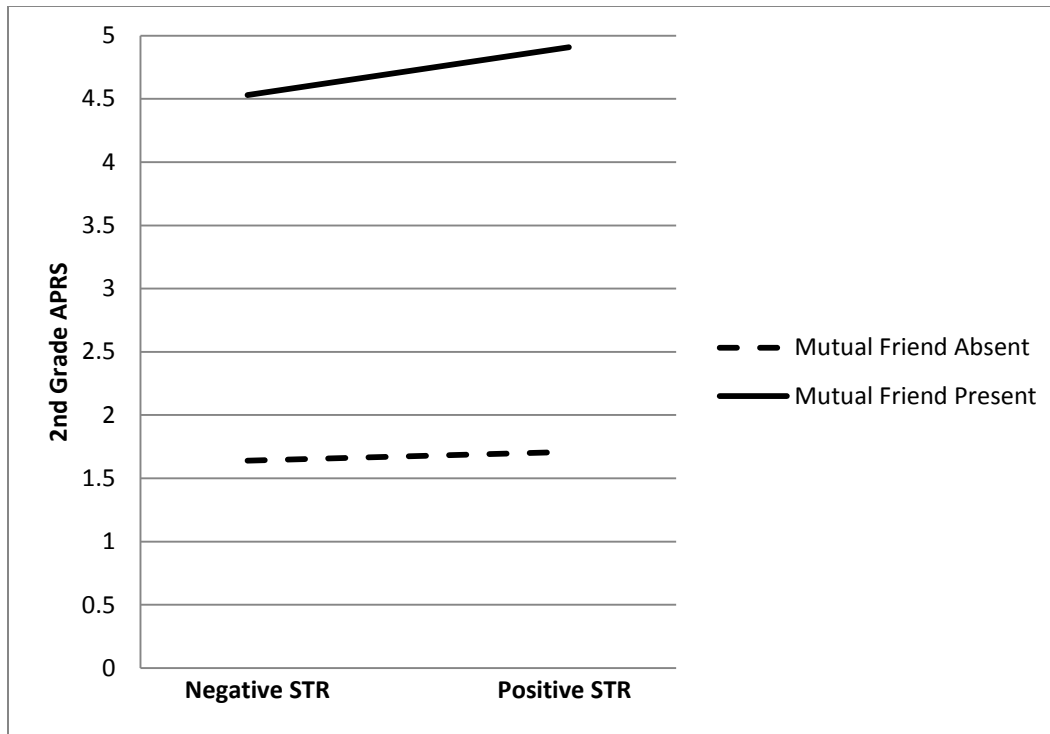
*Summary of Hierarchical Regression Analysis for the Standardized Academic Achievement via the Reading Composite and Math Composite Scores.*

	<u>Reading Composite</u>		<u>Math Composite</u>	
	$\beta$	$R^2$	$\beta$	$R^2$
Step 1		.39		.46
IQ	.63**		.68**	
Step 2		.41		.48
IQ	.62**		.67**	
STRS	.11		.10	
Mutual Friend	.05		.04	
Step 3		.41		.48
IQ	.62**		.68**	
STRS	.11		.09	
Mutual Friend	.05		.04	
STRS x Mutual Friend	.01		-.02	
* $p < .05$ ; ** $p < .01$				

Table 6

*Meditational Analysis: Kindergarten Relationships Predicting Academic Achievement.*

	<u>APRS</u> <u>(Dependent Variable)</u>		<u>PSPCSC</u> <u>(Mediating Variable)</u>	
	$\beta$	$R^2$	$\beta$	$R^2$
Step 1				
STRS	.41**	.17*	-	-
Mutual Friend	.14			
STRS x Mutual Friend	.18*			
Step 2				
STRS	-	-	.06	.01
Mutual Friend			-.05	
STRS x Mutual Friend			.04	
* $p < .05$ ; ** $p < .01$				



*Figure 1.* Interaction of kindergarten student-teacher relationships and mutual friends in predicting academic achievement in second grade on the Academic Performance Rating Scale.